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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/628,323	07/28/2003	Niels Johannes Beck	1125.131	4443
23598	7590	11/12/2004	EXAMINER	
BOYLE FREDRICKSON NEWHOLM STEIN & GRATZ, S.C. 250 E. WISCONSIN AVENUE SUITE 1030 MILWAUKEE, WI 53202			TRIEU, THAI BA	
			ART UNIT	PAPER NUMBER
			3748	

DATE MAILED: 11/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/628,323

Applicant(s)

BECK ET AL.

Examiner

Thai-Ba Trieu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-28, 31, 33 and 38 is/are allowed.
- 6) ☒ Claim(s) 29, 30, 32 and 34 is/are rejected.
- 7) ☒ Claim(s) 35-37 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the Amendment filed on September 02, 2004. Applicant's cooperation in correcting the informalities in the drawing and specification is appreciated. Claims **6-7, 9, 13, 15, 17-28, and 30-37** were amended.

Applicant's arguments, see Pages 19-25, filed September 02, 2004, with respect to the rejection(s) of claim(s) **29-30, 32 and 34** under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is set forth below.

The terminal disclaimer filed on September 02, 2004, has been approved. Accordingly, the double Patenting Rejection has been withdrawn.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zur Loye et al. (Patent Number WO 98/10179 A2), in view of Nozowa et al. (Patent Number 6,031652).

Zur Loye discloses a method comprising:

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injecting a liquid fuel into an air stream to form a homogeneous mixture of air (via fuel injector 42) (See Figure 1, Pages 4, lines 15-27, and Page 5, lines 1-2);

admitting said mixture into a combustion chamber of an internal combustion engine (See Figure 1);

igniting the liquid fuel in said mixture by compression ignition so as to achieve homogeneous charge compression ignition (HCCI) of said liquid fuel (See Figure 1, Page 5, lines 17-28, Pages 6-8, lines 1-27, and Page 9, lines 1-4).

However, Zur Loye fails to disclose atomized droplets of fuel having a diameter less than about 50 microns and between about 5 microns and about 20 microns.

Nozawa et al. teach that it is conventional in the combustion system art having variable fuel atomization control, to utilize an atomized droplets of fuel (via 18) having a diameter less than about 50 microns and between about 5 microns and about 20 microns (See Abstract, Figures 5A-5b, and Column 2, lines 11-19 and 53-54, Column 6, lines 66-67, , Column 7, lines 1-9 and 41-52).

It would has been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized an atomized droplets of fuel having a diameter less than about 50 microns and between about 5 microns and about 20 microns, as taught by Nozawa, to improve the efficiency of Zur Loye device, since the use thereof would have improved the microscopic homogeneity and reduced particulate matter production.

Claims 32 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zur Loye et al. (Patent Number WO 98/10179 A2), in view of Nozowa et al. (Patent Number 6,031652), and further in view of Talbert (Patent Number 4,429,675).

The modified Zur Loye device discloses the invention as recited above; however, fails to disclose said liquid fuel being injected via at least one fogging nozzle and having an impaction device.

Talbert teaches that it is conventional in the fuel system of the internal combustion engine art, to utilize a fogging nozzle (via 99) to inject said liquid fuel and an impaction device to atomize fuel droplets(See Figure 1, Column 4, lines 59-68, and Column 5, lines 1-3).

It would have been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized the fogging nozzle and an impaction device, as taught by Talbert, to provide fine fuel droplets and improve the efficiency of the modified Zur Loye device.

Allowable Subject Matter

Claims **1-28, 31, 33, and 38** are allowed.

Claims **35-37** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments with respect to claims **1-38** have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Dickey (US Patent Number 5,875,743) discloses an apparatus and a method for controlling homogeneous charge compression ignition combustion in diesel engines.
- Iida (US Patent Number 6,640,754 B1) discloses an ignition timing system for homogeneous charge compression engine.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thai-Ba Trieu whose telephone number is (703) 308-6450. The examiner can normally be reached on Monday - Thursday (6:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion can be reached on (703) 308-2623. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TTB
November 9, 2004



Thai-Ba Trieu
Patent Examiner
Art Unit 3748